

**Support for Amendment:**

Independent claims 1 and 58 are amended to include the features of dependent claim 9. This amended is further supported by the specification at, for example, page 10, line 22 through page 11, line 3, and page 25, line 29 through page 26, line 5.

Claims 8 and 9 are cancelled.

Claim 10 is amended so that it depends on claim 1 rather than cancelled claim 9.

No new matter is introduced by this amendment, and entry thereof is requested. Upon entry, claims 1, 3-7, 10-12, 14, 15, 18, 20, 22, 24, 26, 28, 30, 32, and 58-70 are active in this application.

**Remarks**

The outstanding Office Action includes a prior art-based rejection of claims 1, 3, 5, 7, 8, 14, 15, 18, 19, 20, 22, 24, 26, 28, 30, 32, 58, and 60-70 under 35 U.S.C. § 103(a) over U.S. Patent No. 6,029,395 to Morgan and U.S. Patent No. 6,946,496 to Mankiewicz. In view of the amendment to independent claims 1 and 58 resulting in the incorporation of the features of claim 9 into claims 1 and 58, it is submitted that this rejection has been rendered moot. Accordingly, withdrawal of this rejection is requested.

The outstanding Office Action includes a rejection of claims 4 and 6 under 35 U.S.C. § 103(a) over Morgan, Mankiewicz, and JP 2195830 to Wake et al. In view of the amendment to independent claim 1 resulting in the incorporation of the features of claim 9 into claim 1, it is submitted that this rejection has been rendered moot. Accordingly, withdrawal of this rejection is requested.

Claims 11, 12, and 59 stand rejected under 35 U.S.C. § 103(a) over Morgan, Mankiewicz, and U.S. Patent No. 4,797,145 to Wallace et al. In view of the above amendment to independent claim 1 resulting in the incorporation of the features of claim 9 into claim 1, it is submitted that this rejection has been rendered moot. Accordingly, withdrawal of this rejection is requested.

The outstanding Office Action includes a rejection of claims 9 and 10 under 35 U.S.C. § 103(a) over Morgan, Mankiewicz, and U.S. Patent No. 5,441,877 to Chiaffredo et al. This rejection is traversed.

The present invention according to independent claim 1 is directed at a mixture in dry-powder form. The mixture in dry-powder form can be used to form a film or membrane for treating a soil surface or a soil mass. The mixture in dry-powder form includes a water-soluble,

dried and ground organic raw material, a thickening agent, and a pigment. The water-soluble, dried and ground organic raw material includes vegetable debris that is at least one of dried and ground seaweed, sea grass, or kelp. In addition, the mixture comprises 3 to 6 parts by weight of the vegetable debris. Furthermore, at least one component of the mixture in dry-powder form has a sufficient antioxidizing effect to ensure that the film or membrane has an antioxidizing effect on surrounding soil. Furthermore, the mixture in dry-powder form is saturated with electrons to at least electrical neutrality. The film or membrane is formed by spreading the mixture over the soil surface or by arranging the mixture in the soil mass. According to independent claim 58, at least a portion of the film or membrane is formed at some distance down in the soil when the mixture is either spread over the soil surface or arranged in the soil mass.

Morgan discloses a biodegradable mulch mat comprising an air and water permeable, light impermeable, open celled, composite of granules and fibers in a binder matrix prepared from a foam precursor. See Morgan at the Abstract. The Examiner's attention is directed to Morgan beginning at column 4, line 8. This portion of Morgan describes preparing mulch mats from "foamed slurries of fiber, granules, binder and surfactant in an aqueous medium." See Morgan at column 4, lines 8-9. As further described by Morgan, "on an air free basis useful slurries can comprise from about 5 to 35 weight percent solids." See Morgan at column 4, lines 15-17. Clearly, the foamed slurries described by Morgan for preparing a mulch mat are not a mixture in dry-powder form according to the presently claimed invention. Furthermore, Morgan describes the slurries for forming the mulch mat of his invention "tend to be stable and can be stored for extended periods." See Morgan at column 4, lines 29-31. Clearly, Morgan does not disclose a mixture in dry-powder form for forming a film or membrane according to the presently claimed invention.

The outstanding Office Action contends that "Morgan teaches a mixture in dry-powder form (the mixture initially is in dry-powder form due to the ingredients making up the mixture

such as granules, flour, saw dust, etc. (see col. 2, lines 35-37, col. 3, lines 10-38)) for forming a film or membrane (the mixture is a slurry sprayed over soil to form a film or membrane, col. 1, lines 60-61, col. 5, lines 65-67, col. 6, lines 1-30, col. 7, lines 16-24) for treating at least one of a soil surface and/or a soil mass.” See the outstanding Office Action at page 2. While certain components use to form the slurry according to Morgan may be available in dry form, it is clear that Morgan does not teach a mixture in dry-powder for forming a film or membrane according to the presently claimed invention. It is submitted that the Examiner needs to look at the environment in which all of the components are combined according to Morgan. Clearly, Morgan discloses a slurry which is not a mixture in dry-powder form according to the presently claimed invention.

The mixture in dry-powder form according to the presently claimed invention forms a film or membrane as a result of spreading the mixture over the soil surface or by arranging the mixture in the soil mass. The Examiner’s attention is directed to the specification at, for example, page 9, lines 3-7, where a dry-powder mixture is described as “sprinkled over the soil” to form the film or membrane.

The outstanding Office Action recognizes that “Morgan is silent about wherein the powder mixture is saturated with electrons to at least electrical neutrality.” See the outstanding Office Action at page 3, lines 1-2. This feature is in both independent claims 1 and 58. It is pointed out, however, that there are several additional differences between the present invention and Morgan. Each of these differences is discussed in turn.

Morgan fails to teach or suggest a water-soluble, dry and ground organic raw material comprising vegetable debris that is at least one of dried and ground seaweed, sea grass, or kelp, and wherein the mixture comprises 3 to 6 parts by weight of the vegetable debris according to the presently claimed invention.

Morgan fails to teach or suggest a mixture in dry-powder that includes at least one component having a sufficient antioxidising effect to ensure that a formed film or membrane has an antioxidising effect on the surroundings according to claims 1 and 58. Instead, Morgan discloses the use of an anti-oxidising compound that may be added to aqueous foam in order to increase the UV-light resistance of the mulch mat itself. See Morgan at column 5, lines 1-5. As such Morgan makes no suggestion regarding the use of antioxidants in sufficient amounts to produce an antioxidising effect on the surrounding environment. Because Morgan only discloses that the binder leaches into the top soil, there is no teaching or suggestion in Morgan that foam containing any antioxidant would penetrate into the area surrounding the mat. See Morgan at column 4, lines 1-8.

Additionally, and as can be seen from the above-identified application at page 21, line 38 through page 22, line 26, a feature of the disclosed membrane is the ability of the membrane to destroy oxidants in the micro air-layer just above the soil surface (i.e. the surroundings specified in claims 1 and 58). This feature protects the plants from damages caused by formation of ozone in the top soil when illuminated by sun light. Formation of ozone in the top soil is as far as the inventor knows a discovery made by the inventor and represents the unobvious discovery of a new problem. No prior art of the inventor's knowledge teaches the importance of destroying ozone and other oxidisers in the air just above the top soil (including of course; the top layer of the soil). Plant damages due to ozone and other oxidants have traditionally been reckoned as an air-borne pollution problem, and not a problem of ozone formation in the soil surface. Thus a skilled person in the art, believing that ozone damage was airborne problem having no relationship to the soil itself, would not have been lead by the cited prior art to arrive at the claimed invention and specifically to the claimed feature of at least one of the compounds having a sufficient antioxidising effect on the surroundings. Thus a skilled person would have no incentive for making an anti-oxidising membrane into the top soil to protect the vulnerable plant roots/young plants, nor would the skilled person read the cited prior art with the aim of finding such a plant root protecting membrane. The closest cited prior art providing a mat with many of

the similar properties, Morgan, teaches the opposite, to form a protective mat on-top of the soil. Based on at least the foregoing reasoning, claims 1 and 58 are patentable over Morgan.

Morgan fails to disclose a mixture for forming a film or membrane according to claims 1 and 58. Instead, Morgan discloses a mulch mat that is formed in aqueous foam. See Morgan at column 4, lines 8-9. The claimed invention is a powder mixture which, when dissolved in water or other polar solvents and administered to a soil surface, will penetrate a distance into the soil surface and set into a solid mechanically and chemically protective membrane. The membrane will endure for at least a couple of weeks, but may last an entire growth season or more, depending upon amounts and composition of the powder mixture. The mechanically and chemically protective membrane has a combined effect in that it is mechanically solid, wear resistant, water penetrable, water stabilizing (retains moisture), antioxidising, and temperature regulating for the above mentioned period of time. This combined effect provides plants with a protection against oxidants, disadvantageous temperatures, and drought through at least a part of the growth season. The claimed invention should thus not be considered as a fertilizer or mulch composition, it is primarily powder mixture forming a mechanically and chemically protective membrane in the top soil. The membrane has a secondary effect of being biodegradable and acting as a fertilizer, but only after servicing as the primary mechanically and chemically protective membrane.

A powder amount of 1 g per square meter soil surface corresponds to a need for only 10 kg of the powder per hectare land, which is at least one order of magnitude (often several orders of magnitude) lower than any comparable prior art. As mentioned previously, Morgan requires fibers in the general amount of at least 54 g per square meter. See Morgan at column 6, lines 58-67. The effectiveness of the claimed invention drives the costs down to a level where it becomes economically viable to employ the invention in a very large scale such as geo-engineering entire landscapes by changing the albedo. The specific combination of protections provided by this coating has shown impressively good results in various test sites with very different climate

conditions in Kuwait, Egypt, Spain, and Norway in enhancing plant growth and in making barren land arable. Further, please note that the powder mixture according to the claimed invention does not include a reinforcing compound, but instead the cover/membrane forming mixture penetrates into and binds particulate material in the soil to give the necessary mechanical strength to the resulting membrane. This is believed to be one reason for the low dosages of dry powder required to make an effective membrane.

Morgan fails to disclose or suggest a mixture for forming a film or membrane wherein at least a portion of the film or membrane is formed at some distance down in the soil mass when the mixture is spread over the soil surface, arranged in the soil mass, or both, as specified in claim 58. Instead, and as stated previously, Morgan discloses a mulch mat having fibers that is disposed on the top surface of the soil. The claimed invention does not use fibres in the powder mixture since the aim of this membrane forming solution is to make the membrane form mainly into the soil, and not on-top of the soil. This difference makes it possible to obtain the same effects of fertilizing, erosion protection, temperature regulation etc. as the mat according to Morgan, but with only 1 - 3 g dry matter per square meter soil surface as opposed to about at least 54 g dry matter per square meter in Morgan. This is a difference of 2 to 3 orders of magnitude, and is a clear indication that it should not be considered obvious to a skilled person.

Mankiewicz discloses artificial soil including a plurality of foam plastic fragments. See the abstract of Mankiewicz. Mankiewicz describes the artificial soil in the context of Figures 1 and 2 beginning at column 3, line 4. The artificial soil is shown at reference 10 and includes fragments 14 of a light-weight foam plastic having a colloidal gel coating thereon, and forms a matrix 12 having pores 20. The outstanding Office Action apparently relies upon Mankiewicz for the disclosure of negative electric charges at column 7, lines 40-60. It is not seen where this portion of Mankiewicz actually discloses or suggests saturating a powder mixture with electrons to at least electrical neutrality according to the presently claimed invention. This portion of Mankiewicz states:

“the mechanisms involved could modify the concentration of oxygen and free electrons, thereby affecting the solubilities and availabilities of minerals at varying oxidation and reduction states. In microbial films, surface organisms use oxygen, while deeper within the film, using other electron acceptors, regulating the Eh or electron availability, facilitating anaerobic processes modifying mineral availability as well as pollutant removal capacity.”

See Mankiewicz at column 7, lines 43-51. It is not seen how this disclosure by Mankiewicz can be perceived as a teaching or suggestion to saturate a mixture in dry-powder form according to the present invention with electrons to at least electrical neutrality.

Furthermore, it is submitted that Mankiewicz fails to cure the other defects identified above with respect to Morgan. Mankiewicz fails to suggest modifying Morgan to provide a mixture in dry-powder form according to the present invention. As discussed above, Morgan discloses a mulch mass that is formed in aqueous foam. Mankiewicz fails to suggest modifying Morgan to provide a mixture that can form a film or membrane at some distance down in the soil mass when the mixture is spread over the soil surface, arranged in the soil mass, or both. Mankiewicz describes an artificial soil and would not have suggested modifying Morgan to provide a mixture for forming a film or membrane according to the presently claimed invention.

Furthermore, Mankiewicz fails to suggest the use of a water-soluble, dried and ground organic raw material comprising vegetable debris that is at least one of dried and ground seaweed, sea grass, or kelp, and wherein the mixture comprises 3 to 6 parts by weight of the vegetable debris according to the presently claimed invention

Chiaffredo et al. disclose a biologically enriched substrate containing organic matter rich in colonies of Cyanophyceae and Bryophytes for rapid creation of natural vegetation on bare terrain. See Chiaffredo et al. at Abstract.



Chiaffredo et al. are apparently relied upon for disclosing seaweed in claim 19 at column 5, line 27. See the outstanding Office Action at page 10. It is not seen how the disclosure of seaweed in the lengthy list by Chiaffredo et al. at column 10, lines 27, wherein Chiaffredo et al. are directed at creating a biologically enriched substrate can possibly suggest modifying Morgan or Mankiewicz to achieve a mixture in dry-powder form for forming a film or membrane according to the presently claimed invention. The outstanding Office Action merely draws a conclusion of obviousness without explaining why one having ordinary skill in the art would consider the disclosure of a biologically enriched substrate according to Chiaffredo et al. as a suggestion to modify Morgan or Mankiewicz to create a mixture in dry-powder form for forming a film or membrane according to the presently claimed invention.

In view of the above comments, the claimed invention would not have been obvious from Morgan, Mankiewicz, and Chiaffredo et al. Accordingly, withdrawal of this rejection is requested.

It is believed that this application is in condition for allowance. Early notice to this effect is earnestly solicited.

Respectfully submitted,



MERCHANT & GOULD P.C.  
P.O. Box 2903  
Minneapolis, MN 55402-0903  
(612) 332-5300

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By:

A handwritten signature in dark ink, appearing to read "Dennis R. Daley", written over a horizontal line.

Dennis R. Daley  
Reg. No. 34,994  
DRD/mls